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NOTICE OF ALLOWANCE AND FEE(S) DUE

23413 7590 09/18/2009

CANTOR COLBURN, LLP
20 Church Street
22nd Floor
Hartford, CT 06103

EXAMINER	
WEATHERBY, ELLSWORTH	
ART UNIT	PAPER NUMBER
3768	

DATE MAILED: 09/18/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,564	03/11/2004	Darin R. Okerlund	144726	2563

TITLE OF INVENTION: CARDIAC IMAGING SYSTEM AND METHOD FOR PLANNING MINIMALLY INVASIVE DIRECT CORONARY ARTERY BYPASS SURGERY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	12/18/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23413 7590 09/18/2009

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20 Church Street
22nd Floor
Hartford, CT 06103

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

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nonprovisional	NO	$1510	$300	$0	$1810	12/18/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
WEATHERBY, ELLSWORTH	3768	600-425000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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WEATHERBY, ELLSWORTH	
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DATE MAILED: 09/18/2009

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 791 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 791 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/708,564	OKERLUND ET AL.	
	Examiner	Art Unit	
	ELLSWORTH WEATHERBY	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *11/25/2008*.

2. ☒ The allowed claim(s) is/are *Claims 1-4, 6, 8-13, 16-20, 22-26, and 28-30*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date See Continuation Sheet
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Continuation of Attachment(s) 3. Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date: 12/28/2006; 10/26/2006; 8/16/2006; 6/28/2006; 3/17/2006; 12/20/2004; 9/15/2004; 3/15/2004; 3/11/2004.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John Buckert (Reg. 44,572) on 6/5/2009.

The application has been amended as follows:

Claim 1. (Currently Amended): A method for planning a minimally invasive direct coronary artery bypass (MIDCAB) for a patient, the method comprising:

obtaining acquisition data from a medical imaging system;

generating a 3D model of coronary arteries and one or more cardiac chambers of interest of the patient from said acquisition data, prior to performing said MIDCAB;

identifying one or more anatomical landmarks on said 3D model and inserting corresponding translucent geometric markers thereat, utilizing user input at an operator console;

saving views of said 3D model in a database;

measuring sizes of lesions and a number of the lesions in the coronary arteries utilizing said 3D model;

registering said saved views of said 3D model on a workstation of an interventional system, said saved views of said 3D model having said translucent geometric markers~~; and~~, said registering including importing said saved views of said 3D model having said translucent geometric markers to the coordinate system of said interventional system using said one or more anatomical landmarks;

visualizing one or more of said registered saved views on a display screen of said interventional system; and

utilizing the interventional system to quantify distance and location information for a cardiac point of interest prior performing said MIDCAB; and

identifying an incision location and path for said MIDCAB based on said quantified distance and location information for said cardiac point of interest.

Claim 9. (Currently Amended): A method for planning a minimally invasive direct coronary artery bypass (MIDCAB) for a patient, the method comprising:

obtaining acquisition data from a medical imaging system using a protocol directed toward the coronary arteries and left ventricle;

segmenting said acquisition data using a 3D protocol so as to visualize the coronary arteries and the left ventricle;

generating a 3D model of the coronary arteries and the left ventricle of the patient from said acquisition data, prior to performing said MIDCAB;

identifying one or more anatomical landmarks on said 3D model and inserting corresponding translucent geometric markers thereat, utilizing user input at an operator console;

saving views of said 3D model in a database;

measuring sizes of lesions and a number of lesions in the coronary arteries utilizing said 3D model and identifying, from said 3D model, an orientation and any anomalies associated with the coronary arteries;

registering said saved views of said 3D model on a workstation of an interventional system, said saved views of said 3D model having said translucent geometric markers, said registering including, transforming said saved views of said 3D model having said translucent geometric markers to the coordinate system of said interventional system using said one or more anatomical landmarks;

visualizing one or more of said registered saved views on a display screen of said interventional system; and

~~identifying, from said 3D model, orientation and any anomalies associated with the coronary arteries and the left ventricle;~~

using said identified orientation and anomalies associated with the coronary arteries and said registered saved views to determine appropriate sites for incisions for targeted MIDCAB.

Claim 16. (Currently Amended): A method for planning a minimally invasive direct coronary artery bypass (MIDCAB) for a patient, the method comprising:

obtaining acquisition data from a cardiac computed tomography (CT) imaging system using a protocol directed toward coronary arteries and one or more cardiac chambers of interest;

segmenting said acquisition data using a 3D protocol so as to visualize the coronary arteries, including interior views of the coronary arteries;

generating a 3D model of the coronary arteries of the patient from said acquisition data, prior to performing said MIDCAB;

identifying one or more anatomical landmarks on said 3D model and inserting corresponding translucent geometric markers thereat, utilizing user input at an operator console;

saving views of said 3D model in a database;

measuring sizes of lesions and a number of the lesions in the coronary arteries utilizing said 3D model and identifying, from said 3D model, an orientation and ~~any~~ anomalies associated with the coronary arteries;

registering said saved views of said 3D model on a fluoroscopy system, said saved views of said 3D model having said geometric markers, said registering including transforming said saved views of said 3D model having said translucent geometric markers to the coordinate system of the fluoroscopy system using said one or more anatomical landmarks; ~~and~~

visualizing one or more of said registered saved views with said fluoroscopy system; and

quantifying distance and location information for a cardiac point of interest; and

identifying an incision location and path for said MIDCAB based on said quantified distance and location information for the cardiac point of interest.

Claim 22. (Currently Amended): A system for planning a minimally invasive direct coronary artery bypass (MIDCAB) for a patient, comprising:

a medical imaging system for generating acquisition data;

an image generation subsystem for receiving said acquisition data and generating ~~one or more images and~~ a 3D model of coronary arteries and one or more cardiac chambers of interest of the patient, the image generation subsystem further configured to automatically ~~measuring~~ measure sizes of lesions and a number of the lesions in the coronary arteries utilizing said 3D model;

an operator console configured to receive ~~for receiving~~ user input to identify one or more anatomical landmarks on said ~~one or more images or said~~ 3D model and to insert corresponding geometric markers thereat, said console further configured to save views of said 3D model having said geometric markers to a database;

a workstation of an interventional system configured to receive said saved views of said 3D model having said geometric markers from said database, where said workstation ~~including~~ includes post processing software stored on a computer readable medium for registering ~~said images of said~~ said saved views of said 3D model on an

interventional system ~~, said 3D model having said geometric markers; and~~ by transforming said saved views of said 3D model having said geometric markers to the coordinate system of an interventional system using said one or more anatomical landmarks;

~~wherein said workstation is configured for visualizing one or more of said registered images therewith, quantifying distance land location information for a cardiac point of interest, and identifying an incision location and path for MIDCAB based on said quantified distance and location information for said cardiac point of interest.~~

wherein said workstation of said interventional system is configured to:

import said registered saved views of said 3D model having said geometric markers;

visualize said registered saved views of said 3D model having said geometric markers; and

utilize said registered saved views of said 3D model having said geometric markers to quantify distance and location information for a cardiac point of interest to identify an incision location and path for MIDCAB.

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance: The prior art of record does not disclose or suggest, *inter alia*, a method for planning minimally invasive direct coronary artery bypass (MIDCAB) for a patient, the method comprising: obtaining acquisition data from a medical imaging system; generating a 3D model of the

left ventricle and thoracic wall of the patient from the acquisition data, prior to performing a MIDCAB procedure on the patient; identifying one or more left ventricle anatomical landmarks on said 3D model and inserting geometric markers therein corresponding to selected ones of said anatomical landmarks; registering saved views of said 3D model on an interventional system; and visualizing one or more of said registered saved views with said interventional system; and identifying sizes and numbers of lesions utilizing the 3D model.

Concerning the section 102(b) rejection using Vesely, the examiner agrees with applicant in that the cited reference does not teach or suggest a method or system for planning MIDCAB. Here, the steps of: identifying one or more left ventricle anatomical landmarks on said 3D model and inserting geometric markers therein corresponding to selected ones of said anatomical landmarks; registering saved views of said 3D model on an interventional system; and identifying sizes and numbers of lesions utilizing the 3D model are not taught or suggested by the prior art. Based on the above observations, claims 1-4, 6, 8-13, 16-20, 22-26, and 28-30 are allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Terminal Disclaimer

2. The terminal disclaimer filed on 11/25/2008 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of USPN 7,343,196 has been reviewed and is accepted. The terminal disclaimer has been recorded.

3. The terminal disclaimer filed on 11/25/2008 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 7,346,381 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELLSWORTH WEATHERBY whose telephone number is (571) 272-2248. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EW/

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768